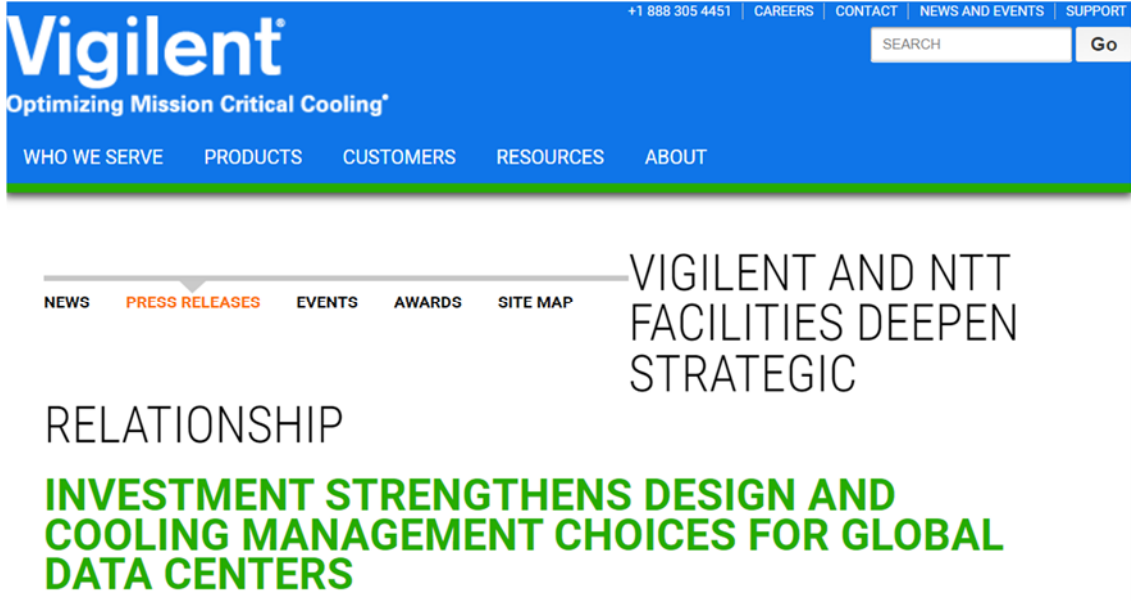


# Exhibit 10

**U.S. Patent No. 6,862,179 – Infringement Claim Chart**

Claim 1	Exemplary Evidence of Infringement by NTT
<p>[1pre] A method of cooling a plurality of racks in a data center, said method comprising:</p>	<p>NTT's data centers use a method of cooling a plurality of racks in a data center.</p> <p>For example, NTT uses Vigilent to manage cooling systems in its data centers.</p>  <p><a href="https://www.vigilent.com/vigilent-and-ntt-facilities-deepen-strategic-relationship/">https://www.vigilent.com/vigilent-and-ntt-facilities-deepen-strategic-relationship/</a></p>



## Vigilent®

### PROJECT AT-A-GLANCE

- NTT Communications set out to improve the overall energy efficiency of its two largest US data centers
- Technology from Vigilent was used to manage cooling systems more efficiently
- NTT managed to eliminate or power down nearly half of its existing cooling units
- Savings included an overall 20% reduction in cooling energy used across the two sites
- Other results included PUE improvements and a reduction in carbon emissions

Representatives from NTT Facilities and Vigilent discuss the results of NTT Facilities deploying the Vigilent Dynamic Cooling Management System.

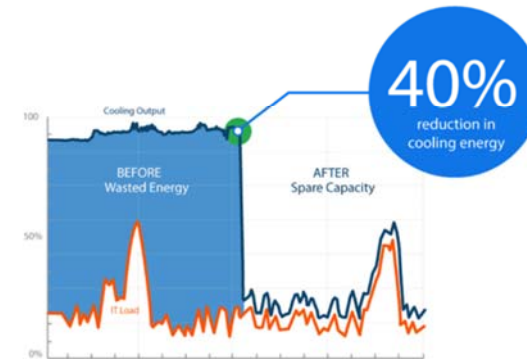
<https://www.vigilent.com/case-study-ntt-facilities-and-vigilent/>

## VIGILENT CONTINUOUSLY MATCHES COOLING OUTPUT TO HEAT LOAD

### Optimized airflow eliminates hot spots.

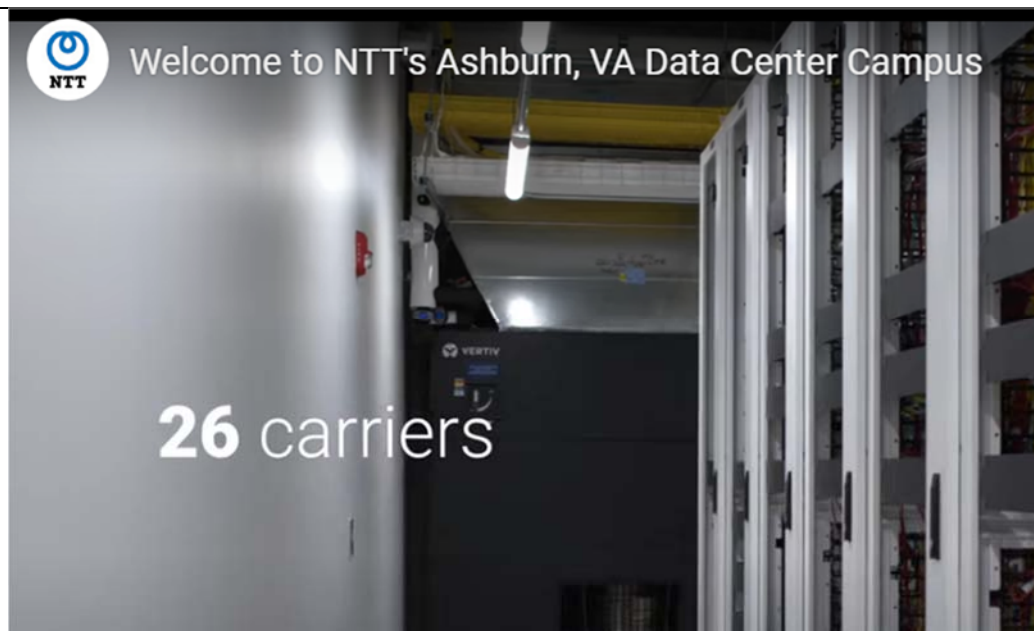
Vigilent continuously optimizes the airflow in your facility, delivering improved reliability and availability. The system automatically finds and eliminates hot spots, while its comprehensive reports and tools facilitate easier operations management.

Our system delivers the right amount of cooling exactly where it's needed. This typically results in up to a 40% reduction in carbon emissions and your cooling energy bill. We achieve that with sophisticated AI-based technology that learns your environment and adapts to change.



<https://www.vigilent.com/who-we-serve/by-facility/data-centers/>

NTT also uses Vertiv (Liebert) cooling units in the colocation data center. Liebert cooling units are controlled by Liebert's iCOM Intelligent Communication and Monitoring system.



<https://services.global.ntt/en-us/services-and-products/global-data-centers/global-locations/americas/ashburn-va-1-data-center>



<https://services.global.ntt/en-us/services-and-products/global-data-centers/global-locations/americas/hillsboro-hil-data-center>

Maintaining optimal temperatures in a data vault is essential to keeping critical infrastructure up and running. At our Chicago CH1 Data Center, we recirculate the heat produced in each of the 6MW vaults using our Vertiv Liebert fan walls. As warm air is exhausted from densely stacked servers into a contained hot aisle, the fan walls output cool 75°F air at a rate designed to maintain a constant pressure differential between the cold and hot aisles of our clients' racks. The hot air is channeled into a common return plenum and then back to the fan walls where the cycle begins again. The units themselves are carefully placed throughout the vault to ensure that the entire vault meets the CFD modeling and hot spots are minimized. Click [here](#) to learn more about our Chicago data center.

<https://services.global.ntt/en-us/insights/blog/chicago-construction-updates>

With scalable pre-fabricated solutions like Vertiv™ SmartMod™ and the quickly deployed Power Module, Vertiv is standardizing modular systems so you can get your data center running, faster.

**Vertiv.com**



[https://issuu.com/businessreviewusa/docs/bro\\_bc\\_usa\\_ragingwire\\_data\\_centers](https://issuu.com/businessreviewusa/docs/bro_bc_usa_ragingwire_data_centers)

**SmartMod incorporates:**



- Modular and scalable Vertiv™ Liebert® UPS power protection
- Close-coupled in-row Liebert® CRD thermal management units with intelligent iCOM™ Edge controls

[https://www.vertiv.com/4ad535/globalassets/products/critical-power/integrated-solutions/vertiv-smartmod-na-brochure\\_0.pdf](https://www.vertiv.com/4ad535/globalassets/products/critical-power/integrated-solutions/vertiv-smartmod-na-brochure_0.pdf)



<https://www.vertiv.com/49d637/globalassets/shared/liebert-icom-thermal-system-controls-brochure.pdf> (“iCOM Brochure”).



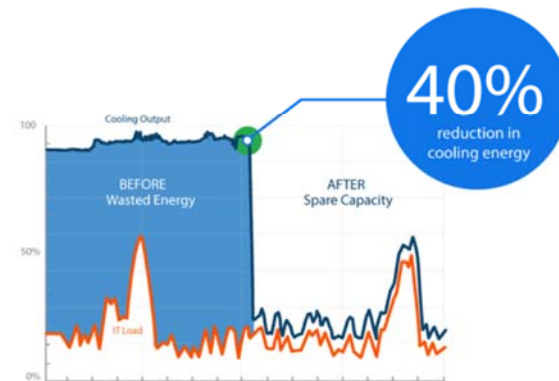
	<p><b>At the cooling unit level</b>, the Liebert iCOM unit control provides the highest protection available and optimal performance.</p> <ul style="list-style-type: none"> <li>• Monitors 380 unit and component points to eliminate single points of failure</li> <li>• Self-healing features avoid passing unsafe operating thresholds</li> <li>• Highly intuitive, full-color, touch screen simplifies operations to save time and reduce human error</li> <li>• Multiple, automated unit protection routines, including lead/lag, cascade, rapid restart, refrigerant protection and valve calibration</li> </ul>  <p><b>At the supervisory level</b>, the Liebert iCOM-S system control offers a revolutionary way to harmonize and optimize thermal system performance to optimize capacity across the data center, gain quick access to actionable data, and automate system diagnostics and trending.</p> <ul style="list-style-type: none"> <li>• Advanced monitoring and at-a-glance reporting on performance metrics and trends for efficiency, capacity and adverse events</li> <li>• Up to 50% system efficiency gains</li> <li>• 30% lower deployment costs</li> <li>• Teamwork modes that prevent conflict between units and allow them to adapt to changes in facility and IT demand to improve efficiency and availability and reduce system wear and tear – saving more than \$10,000 per unit per year in energy costs</li> <li>• Simple and easy to deploy — auto-configuration to detect and configure up to 4,800 sensors, eliminating the need for custom integration to building management systems and cutting sensor deployment times in half</li> </ul>  <p>Liebert iCOM unit control and Liebert iCOM-S system control are available for new Vertiv™ data center cooling units or as retrofits.</p> <p>iCOM Brochure at p. 3.</p>
[1a] activating a cooling device and opening a controllable partition configured to vary a supply of cooling fluid within a zone of said data center, said zone including at least one associated rack of said plurality of racks;	<p>NTT activates a cooling device and opening a controllable partition configured to vary a supply of cooling fluid within a zone of said data center, said zone including at least one associated rack of said plurality of racks.</p> <p>For example, NTT uses Vigilent’s optimized airflow system which utilizes artificial intelligence to remotely control air conditioners to provide the right amount of cooling exactly where and when it is needed.</p>

## VIGILENT CONTINUOUSLY MATCHES COOLING OUTPUT TO HEAT LOAD

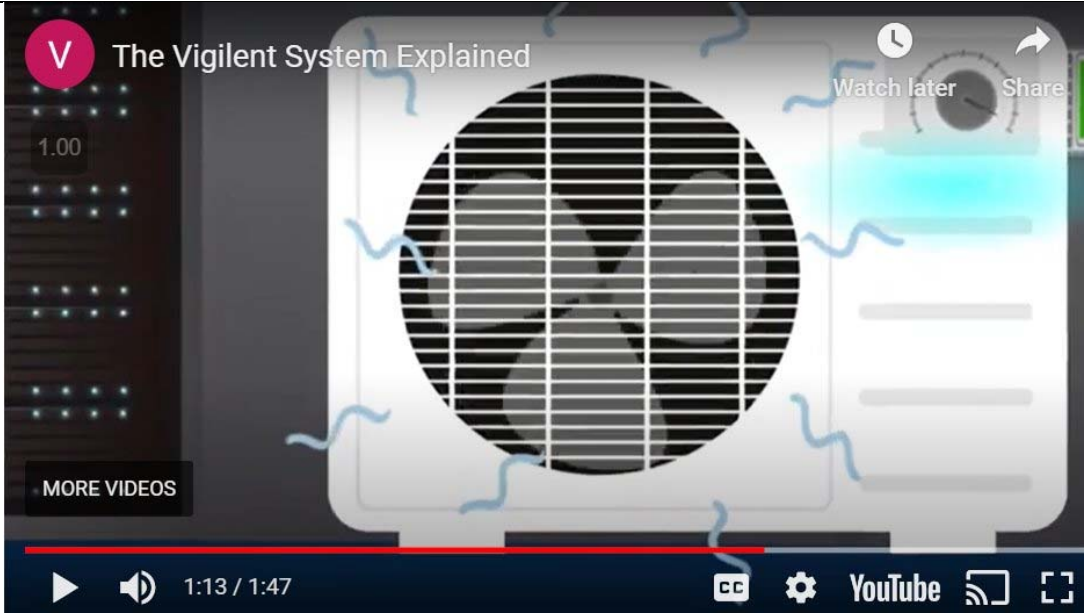
### Optimized airflow eliminates hot spots.

Vigilent continuously optimizes the airflow in your facility, delivering improved reliability and availability. The system automatically finds and eliminates hot spots, while its comprehensive reports and tools facilitate easier operations management.

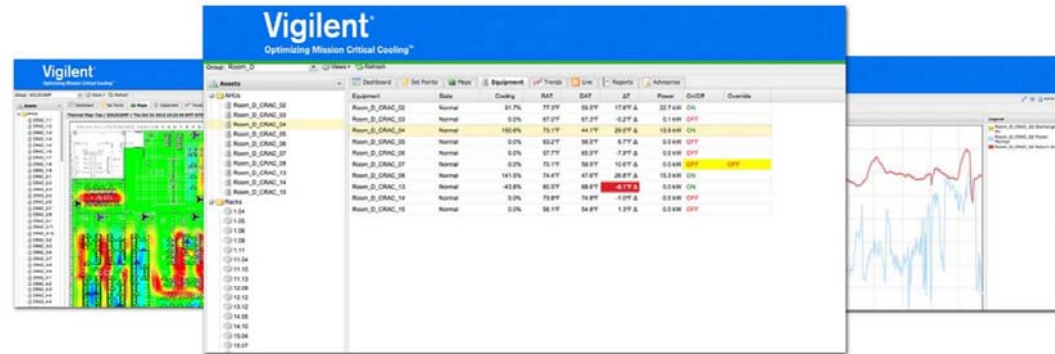
Our system delivers the right amount of cooling exactly where it's needed. This typically results in up to a 40% reduction in carbon emissions and your cooling energy bill. We achieve that with sophisticated AI-based technology that learns your environment and adapts to change.



<https://www.vigilent.com/who-we-serve/by-facility/data-centers/>.

	 <p><a href="https://www.vigilant.com/the-vigilant-system-explained/">https://www.vigilant.com/the-vigilant-system-explained/</a>, at 1:13.</p> <p>NTT also uses Liebert iCOM. Liebert's iCOM Intelligent Communication and Monitoring fluid economizer system activates the flow of chilled water/glycol, and varies cooling capacity by adjusting a motorized ball valve (controllable partition).</p> <p><b>7.1.4 Temperature Control with a Fluid Economizer</b></p> <p>When an economizer is installed, the cooling requirement (determined by the temperature proportional band) is addressed first by the economizer's secondary cooling, if the economizer cooling capacity is insufficient, the compressor(s) begin cooling to bring the room air temperature down to the temperature setpoint.</p> <p>The fluid economizer employs a motorized ball valve that controls the flow of chilled water/glycol to provide a cooling capacity from 0% to 100%.</p>
[1b] sensing the temperature of said at least one associated rack;	NTT senses the temperature of said at least one associated rack.

For example, NTT uses Vigilent's Optimizing Mission Critical Cooling to sense temperatures.



#### EVERYDAY TOOLS

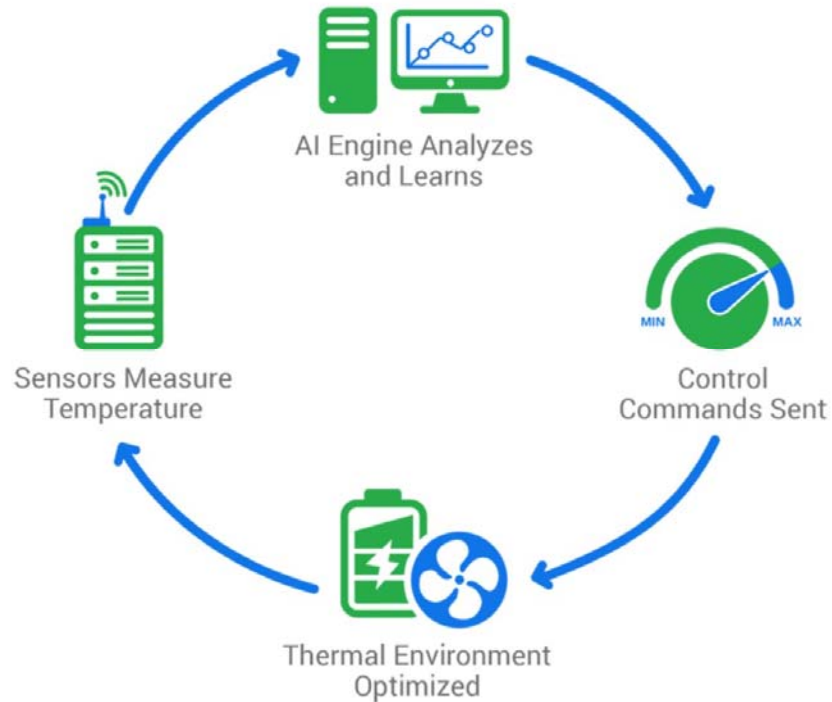
With our intuitive, at-a-glance system interface, checking the current status of your facility is always at your fingertips.

#### CHECK TEMPERATURES

With a few clicks, you can quickly dive down from a broad facility view into the real-time temperature data of one specific rack sensor.

#### EASY TRENDING

Customize data to quickly surface the information you need.



<https://www.vigilent.com/products-and-services/dynamic-control/>.

NTT also uses Liebert cooling units and the Liebert cooling unit control system senses temperatures.

### 13.2 Installing Wired Remote Sensors

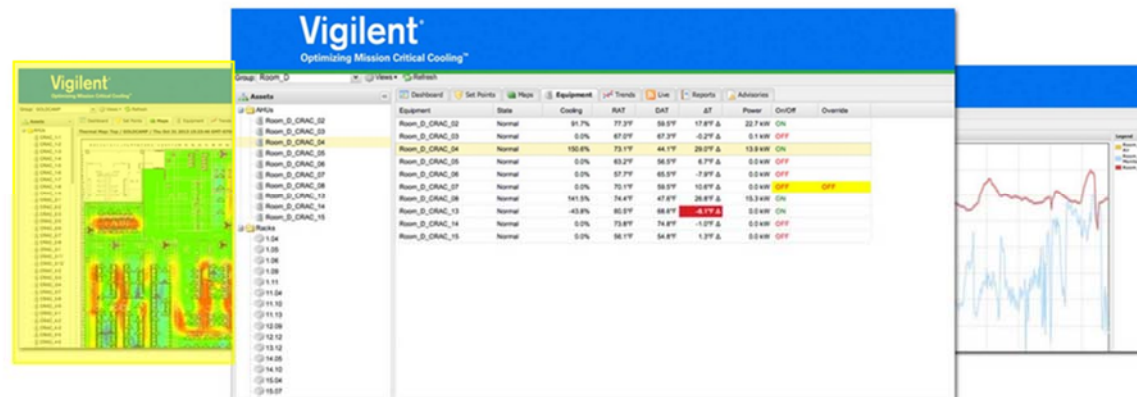
Up to 10 remote sensor modules, installed in the monitored racks and connected to the cooling unit, provide control and reference input to iCOM and building-management systems. Using remote, rack sensors combats cooling problems related to recirculation air, uneven rack loading, and air distribution.

[https://www.vertiv.com/49b8b2/globalassets/shared/liebert-icom-user-manual\\_sl-31075.pdf](https://www.vertiv.com/49b8b2/globalassets/shared/liebert-icom-user-manual_sl-31075.pdf), p. 180.

[1c] determining whether said sensed temperature is within a predetermined temperature range; and

NTT determines whether said sensed temperature is within a predetermined temperature range.

For example, NTT uses Vigilent's Optimizing Mission Critical Cooling to check the temperatures within its data centers to determine whether the sensed temperature is within a predefined temperature range.



#### EVERYDAY TOOLS

With our intuitive, at-a-glance system interface, checking the current status of your facility is always at your fingertips.

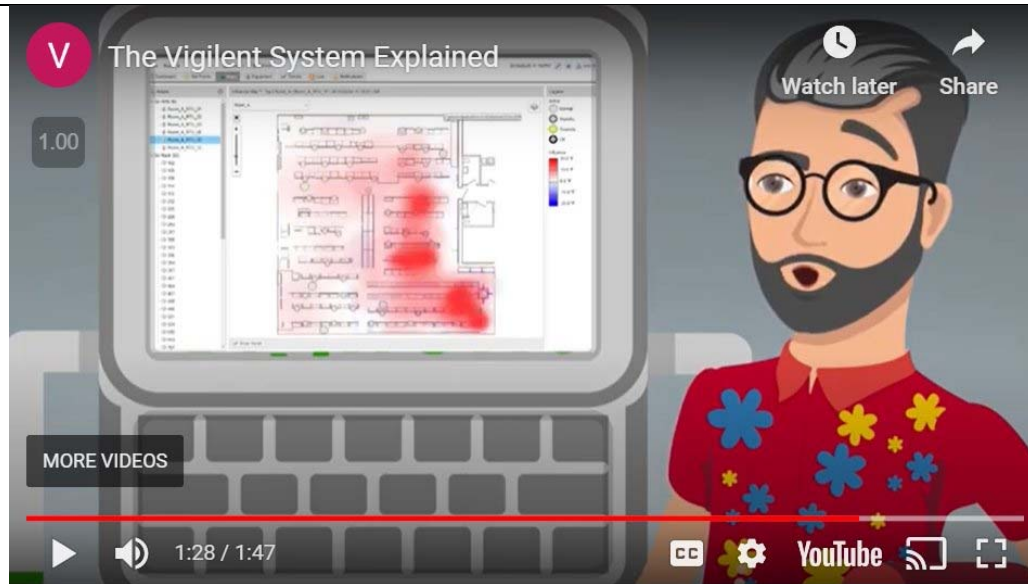
#### CHECK TEMPERATURES

With a few clicks, you can quickly dive down from a broad facility view into the real-time temperature data of one specific rack sensor.

#### EASY TRENDING

Customize data to quickly surf the information you need.

<https://www.vigilent.com/who-we-serve/by-facility/data-centers/>.



<https://www.vigilent.com/the-vigilent-system-explained/>, at 1:28.

NTT also uses the Liebert iCOM system which is able to identify if the temperature is at the setpoint value, and change the response to the varied flow field based on length of time temperature has deviated, and amount of deviation from setpoint.



	<p><b>Temperature Integration Time</b></p> <p>Adjusts amount of cooling/heating based on the length of time the temperature has deviated from the setpoint. The time selected is the amount of time it will take cooling capacity to reach 100%. For example, if three minutes is selected, cooling capacity will increase to 100% in three minutes.</p> <p>NOTE: Three to five minutes of integration time is adequate for most applications. See <a href="#">Considerations when Using PI Temperature Control</a> on page 28 .</p> <p>NOTE: Only used when Temperature Control Type is PI.</p> <p><b>Temperature Proportional Band</b></p> <p>Adjusts the activation point of cooling/heating components based on deviation from setpoint by placing half of the selected value on each side of the temperature control setpoint. A smaller number causes faster reaction to temperature changes.</p> <p>NOTE: Setting this too low causes short cycling of compressors.</p> <p><a href="https://www.vertiv.com/49b8b2/globalassets/shared/liebert-icom-user-manual_sl-31075.pdf">https://www.vertiv.com/49b8b2/globalassets/shared/liebert-icom-user-manual_sl-31075.pdf</a>, p. 25.</p>
[1d] manipulating said controllable partition to vary said supply of said cooling fluid to said zone in response to said sensed temperature being outside said predetermined temperature range.	<p>NTT manipulates said controllable partition to vary said supply of said cooling fluid to said zone in response to said sensed temperature being outside said predetermined temperature range.</p> <p>For example, NTT uses Vigilent's cooling system to automatically eliminate hot spots in its data centers.</p>



## AT A GLANCE

Cooling becomes a managed resource that reacts to real-time data, which reduces the chances of downtime.

### Automated hot spot reduction

The system can automatically removes 95% (or more) of hot spots and diagnoses how to treat the remaining problems through facility adjustments.

### Instant results

From the moment the system goes live, the energy savings and carbon emissions reductions are immediate.

### Cost savings

The system finds the perfect balance between delivering the right amount of cooling and the lowest possible energy expenditure.

### Constantly adapting

The AI engine constantly changes cooling when it detects new equipment and varying IT loads.

### Analytics

Our system turns mountains of current and historic data into focused, actionable information.

### Risk mitigation

System failsafes help avoid costly outages.

<https://www.vigilent.com/who-we-serve/by-facility/data-centers/>.

NTT also uses Liebert's iCOM system to manipulate the motorized ball valve (controllable partition) from 0% to 100% flow of chilled water/glycol.

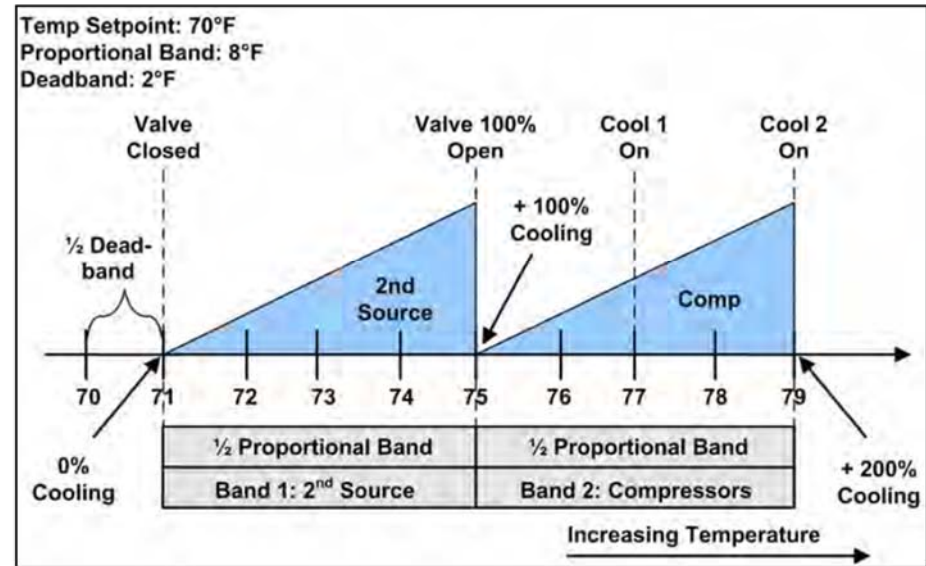
### 7.1.4 Temperature Control with a Fluid Economizer

When an economizer is installed, the cooling requirement (determined by the temperature proportional band) is addressed first by the economizer's secondary cooling, if the economizer cooling capacity is insufficient, the compressor(s) begin cooling to bring the room air temperature down to the temperature setpoint.

The fluid economizer employs a motorized ball valve that controls the flow of chilled water/glycol to provide a cooling capacity from 0% to 100%.

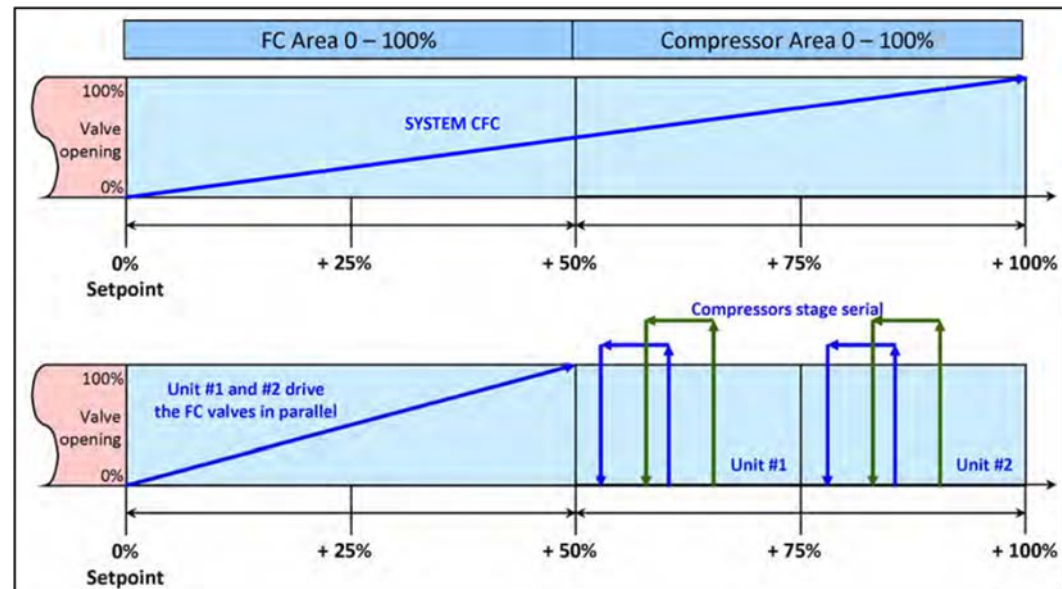
[https://www.vertiv.com/49b8b2/globalassets/shared/liebert-icom-user-manual\\_sl-31075.pdf](https://www.vertiv.com/49b8b2/globalassets/shared/liebert-icom-user-manual_sl-31075.pdf), p. 110.

Figure 3.17 Second Cooling Source and Two-Step Compressorized Cooling



[https://www.vertiv.com/49b8b2/globalassets/shared/liebert-icom-user-manual\\_sl-31075.pdf](https://www.vertiv.com/49b8b2/globalassets/shared/liebert-icom-user-manual_sl-31075.pdf), p. 69, Fig. 3.17.

Figure 3.18 Freecooling and Compressorized Operation



[https://www.vertiv.com/49b8b2/globalassets/shared/liebert-icom-user-manual\\_sl-31075.pdf](https://www.vertiv.com/49b8b2/globalassets/shared/liebert-icom-user-manual_sl-31075.pdf), p. 70, Fig. 3.18.